with its mechanical details, to the surgeon. These details have been extremely well set forth in this paper.

If, then, the surgeon keeps in mind the admonition of Doctor Hunt "that the failure to remove associated disease in the appendix and gall bladder, and the persistence of associated organic disturbance outside the stomach and duodenum are responsible in no small measure for incomplete relief following various operations for duodenal and gastric ulcers," surgery and medicine will have been much benefited.

However, the eradication by surgery of the local manifestation of ulcer is only a part of the successful treatment. The medical and dietary management after surgery is of no small importance.

❦

CLARENCE G. TOLAND, M. D. (1930 Wilshire Boulevard, Los Angeles).—The degree of benefit to be expected in the treatment of gastric and duodenal ulcers depends on many factors, but perhaps none are more important than the surgeon's judgment in deciding when to operate, and in selecting the proper procedure with the ulcer exposed.

Undoubtedly, many of the poor results obtained in the past have been due to either a hasty selection of surgery, an unfortunate choice of surgical procedure, or failure to enforce a strict postoperative regimen.

Doctor Hunt has emphasized the incidence of other intra-abdominal diseases which occur coincidentally with duodenal and gastric ulcers, and we believe these are responsible for the persistence of symptoms postoperatively in many cases.

Pylorospasm, gastric retention, and hyperacidity are almost constant sequelae of peptic ulcers, and the cures that occur from medical treatment are due to correction of these conditions. By the same token, surgery can only succeed in improving an ulcer in the degree that it can relieve these factors.

Excision of an ulcer alone thus gives inferior results unless combined with some form of pyloroplasty or gastro-enterostomy. In duodenal ulcer, Judd's excision of the anterior half of the pyloric sphincter is rational, allowing alkaline regurgitation into the stomach and free motility of the gastric contents.

Whatever improvement follows posterior gastro-enterostomy is in proportion to the correction of these factors.

Similarly with the gastric ulcer, pylorospasm and retention are common, and posterior gastro-enterostomy, in addition to cautery excision, is superior to excision alone.

Physiologically, partial gastrectomy for certain gastric and duodenal ulcers is a sound operation; it removes the ulcerous, acid-forming area with consequent lower postoperative acid figures, it corrects pylorospasm and its attendant evils, and the recurrences are definitely less although they do occur. Practically, however, the high mortality restricts its usefulness to a narrow field.

By regarding gastric and duodenal ulcers as pathologic conditions dependent primarily upon a disordered physiology, the reasons for the superiority of certain surgical procedures can be seen.

Only careful consideration by both the surgeon and the gastro-enterologist extending over a long postoperative period, can we obtain the best results in treating these pathologic lesions, the cause of which we are ignorant.

Doctor Hunt's paper, based on a large series of cases over a period of eleven years, is of great value in establishing the comparative merits of the various surgical procedures advocated.

MULTIPLE MYELOMA*

REPORT OF CASE

By LLOYD BRYAN, M. D.
AND
JOSEPH LEVITIN, M. D.
San Francisco

DISCUSSION *by Edwin I. Bartlett, M. D., San Francisco; C. L. Connor, M. D., San Francisco.*

MYELOMA is a primary malignant disease of bone, characterized by multiple foci in the vertebrae and flat bones of the skeleton. It is associated with an anemia.

The first case described was one by McIntyre in 1845. There have been few additions to the literature, and as late as 1905 Wood was able to collect only thirty cases. With the use of x-ray, diagnosis was made simpler and in 1927 Geschickter and Copeland [3] collected four hundred and twenty-five cases, thirteen of which were their own. Kolodny [5] found only nine typical cases in a review of the material of *The Registry for Bone Tumors.*

The disease is most frequent after middle life, comparable to the age incidence of carcinoma. However, cases have been reported in children.

In common with all malignancies the etiology is unknown. Trauma has been claimed to play an important part. A history of trauma has been found in most cases. However, most patients can recall a trauma some time in their life, and it alone would not explain the multiplicity of the lesions.

The rôle of infection has been seriously considered. In favor of this is the febrile course of the disease and the type of plasma cell found being characteristic of chronic infection.

The most frequent site of the tumor is in the flat bones and spine. All the skeletal bones may be involved. The tumor is confined to the red marrow. It may expand the cortex, thinning it, or may break through. The growth may be very vascular, causing pulsation, or it may be semi-fluctuant as a result of previous hemorrhage. Tumor nodules are often felt along the ribs as the result of expansion of the tumor from within.

While the disease is primarily one of the bone marrow, tumor growths have been found elsewhere, as in the liver, spleen, and regional lymph nodes. It is questionable if these are metastatic or are separate nodules arising in the reticulum of the hemopoietic system. Pulmonary lesions are not found, which is an aid in the differential diagnosis by x-ray.

CLINICAL SYMPTOMS

The most outstanding symptom present in all cases, and which first brings the patient to the doctor, is pain. The onset is insidious, and may be vague, intermittent, neuralgic or rheumatic

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* Read before the Radiology Section of the California Medical Association at the fifty-ninth annual session at Del Monte, April 28 to May 1, 1930.

pain; aggravated by motion or pressure. This may be followed by a period of remission during which the patient is relatively free of symptoms. It is this indefiniteness that accounts for the diagnostic failures in the early stages of the disease. Characteristically, pain is felt on percussion of the bones. Usually it is limited to the back and is attributed to compression of vertebrae, encroachment on the nerve roots by the tumor or periosteal irritation. With involvement of the ribs, pain is present. Headaches are frequent with skull involvement.

With involvement of the spinal column, paraplegia may result. This is caused by compression of the cord by the tumor. Neurological findings of bilateral exaggerated reflexes, positive Babinski, ankle and patellar clonus are present. These changes often recede, probably as a result of vascular changes in the spinal tumor, effecting a regression in its size.

The gastro-intestinal symptoms of nausea, vomiting, and colicky pain may be associated with compression of the spinal cord, or may be due to anemia. In the terminal stages they are often a result of the enterocolitis.

Pathological fracture is a frequent complication. The fractures are often multiple. Union is generally slow and may not take place. Fifty per cent of all the fractures occur in the ribs.

With involvement of the spine, there may appear a characteristic deformity, as described by Geschickter and Copeland,[3] viz., a dorsal kyphosis and flattening of lumbar curve, resulting in a habitus of a protruding abdomen, bulging lower ribs and feet set at a wide base to maintain equilibrium. There may be an actual diminution in size of the patient.

The blood pressure is generally low.

LABORATORY FINDINGS

Myeloma is closely associated with the discussion of Bence-Jones protein. This is a true protein first observed in the urine of patients with this disease by Kahler[4] in 1889. It is precipitated in the presence of acetic acid, coagulating at 40 to 50 degrees Fahrenheit and dissolving on warming. The amount excreted is variable, usually not exceeding one per cent. At first considered specific for myeloma, Bence-Jones protein has been found in other diseases of the bone marrow, namely, metastatic tumors of the bones, multiple sarcoma, osteomalacia, polyfibrocystic disease, lymphatic and myeloid leukemias, and chloroma. This protein is not consistently found, occurring in only 50 per cent of cases. It is intermittently found in the same patient. Casts, red blood cells and albumin are frequently found.

The number of red blood cells is usually between two and three million. Normoblasts and myelocytes have been reported in the blood stream. Plasma cells of the same type seen in the tumor have also been found in smears. These findings indicating regeneration, exclude this disease from falling in the class of aplastic anemia, where attempts of regeneration are not found. The white count varies. Leukocytosis, sometimes found with myelocytes, has led some to regard this disease in the nature of a leukemia. But these findings can be explained by secondary infection, which is often present.

Anemia is a characteristic feature of the disease and is found in the late stages.

The x-ray findings are characteristic and diagnostic. Areas of rarefaction, without bone production, which may expand the cortex; multiple lesions in the flat bones and vertebrae may only be confused with metastatic malignancy. In the spine there may be collapse of the affected body.

DIFFERENTIAL DIAGNOSIS

With the complete syndrome of multiple destructive lesions involving the flat bones and spine, an unexplained anemia and the presence of Bence-Jones protein in the urine, a diagnosis of a myeloma is easily made. Early in the disease differentiation may be extremely difficult.

Tabes dorsalis may be simulated: by the girdle-like pains as result of pressure of the tumor on the spinal nerves; Pott's disease by the erosion of the vertebral column; pernicious anemia by the high color index and nerve changes when the cord is involved. Osteomalacia is simulated by the anemia, deformity, and Bence-Jones protein. The clinical course in both diseases is similar. It is here that the x-ray differentiates the two conditions. Furthermore myeloma does not cause bending of the extremities as found in osteomalacia. Osteitis deformans is simulated by the deformity, but in myeloma there is no bowing of the tibia and no increase in the width of the tables of the calvarium. Nephritis is suggested by the low kidney function, high nonprotein nitrogen retention, albumin, and frequent red blood cells. More cases have been wrongly diagnosed as chronic nephritis than any other disease. The blood pressure in myeloma is always low. Blood chemistry studies will prevent errors in diagnosis. Differentiation from metastatic malignancy is the most difficult problem with the x-ray. The duration of the disease, location of the lesions, and the different types of anemia aid in making the diagnosis. Exploratory incision for microscopic section can be easily made, although Kolodny[5] feels that this procedure is unnecessary because the disease can be diagnosed without it. He also points out that Ewing's sarcoma may be confused microscopically with a myeloma when overstained. Ewing's tumor may be differentiated by the fact that it is a single lesion.

Prognosis.—The disease is fatal. The average duration is two years. Wallgren[6] and Geschickter[3] report patients living five years after onset. Death may be due to extension of the tumor or to the anemia.

Treatment.—As in other malignancies, treatment is only palliative. Deep roentgen therapy offers the best relief. The pain is relieved remarkably by a few exposures. In a disease that tends toward remissions it has been questionable

how much of the improvement is due to the actual destruction of the tumor. It is commonly believed that x-ray is only palliative and does not cure or arrest the disease. In our case it was noted that not only was the pain relieved under therapy, but new bone filled in the destroyed areas. The tumor became smaller and the patient was kept comfortable for a period of three years.

Transfusions are indicated when the anemia is severe, and it is advisable to keep the patient at rest to avoid pathological fractures.

REPORT OF CASE

History.—A woman, age thirty-nine, born in Vienna, Austria, married and having two children, had diphtheria at the age of twenty and an appendectomy at the age of twenty-five. During her fifth month of pregnancy she began to feel pain in the upper dorsal spine. The pain was more severe at the end of the day and relieved when she lay in bed; with this there was weakness in her legs.

Physical Findings.— Essential findings as follows: Temperature, 99 degrees Fahrenheit. Blood pressure 134 millimeters, systolic. An area of dullness existed in the chest between the upper angle of the right scapula and spine, with diminution of the breath sounds. Flexion was limited and painful in the dorsal region, and the dorsal spine was held rigid. Knee-jerks were increased. Knee and ankle clonus was present. There were disturbances in sensation to sharp and blunt between the costal margin and the groin, hypoasthesia to hot and cold, and a marked Romberg.

X-ray: A rounded irregular shadow of increased density was seen at the level of the head of the third right rib, suggesting a new growth, and there was a destructive process of the fourth rib on the right, extending from the postaxillary region to the vertebral column, and on the ninth rib on the left.

Blood: Hemoglobin, 70 per cent Sahli; red blood cells, 3,850,000; white blood cells, 8200.

Urine: Negative.

X-ray examination, including gastro-intestinal series, failed to reveal a primary growth.

Impression: A malignant tumor, probably primary in the lung, with metastases into the ribs and fourth dorsal vertebra.

Examination one year after onset, October 1927, showed increased neurological findings. Patient had a complete paraplegia. X-ray showed destructive processes involving the third and sixth ribs anteriorly on the left, ninth and tenth posteriorly on the left, the fourth and eleventh ribs on the right, and the fourth dorsal vertebra. The urine showed numerous red blood cells and a slight trace of albumin. Bence-Jones protein was not found. Impression was of the presence of multiple malignant tumors of the spine and ribs; with question of a primary hypernephroma in view of the findings of red blood cells in the urine. At this time the patient was referred to us for x-ray therapy by Doctors L. Eloesser and R. Morris. Radiation was given over the dorsal spine and affected ribs, using 200 kilovolts, one-half millimeter copper filter, at a distance of fifty-five centimeters. Exposures of one hundred milliampere minutes were given. The response was almost immediate. Pain was relieved and signs of cord pressure disappeared. For the following year the patient received treatments at intervals, returning whenever pain reappeared. In the interim she was able to be up and about, and perform her routine household duties. Her condition was closely checked by x-ray studies. The areas of destruction showed regeneration of bone. In October 1928, after an absence of two months, she returned with swelling over the maxilla, headaches, and pain low in the pelvis. The x-ray picture showed multiple areas of rarefaction in the skull and a similar process in the pelvis. The blood at this time showed: hemoglobin, 60 per cent Sahli; red blood cells, 4,000,000; white blood cells, 6000. The urine contained a trace of albumin, no blood cells, and no Bence-Jones protein. A few exposures over the calvarium reduced the swelling over the maxilla and relieved the headache. On account of loss of hair she refused further treatment over the skull. She did not reappear for three months, when in response to a follow-up letter she returned. Her complaint now was weakness and pain over the lower back. The blood showed a marked change. The hemoglobin was 18 per cent Sahli; red blood cells, 1,200,000; white blood cells, 1550; and 86 per cent polymorphonuclears. Therapy over the affected areas was given with relief of pain. It was noted here that the color index had risen from 0.75 to 1.0, resembling a primary anemia. A blood transfusion was given and a definite improvement followed. For the following two months frequent transfusions were given. This was always followed by a temporary improvement in her general condition. Repeated examinations of the urine for Bence-Jones protein were negative.

During the patient's stay in the hospital the elevation of temperature averaged 37.8. A biopsy was made at this time from a section of bone that had received no radiation.

Fig. 1.—Destruction of the third rib posteriorly. Expansion of the head to a large tumor mass. October, 1926.

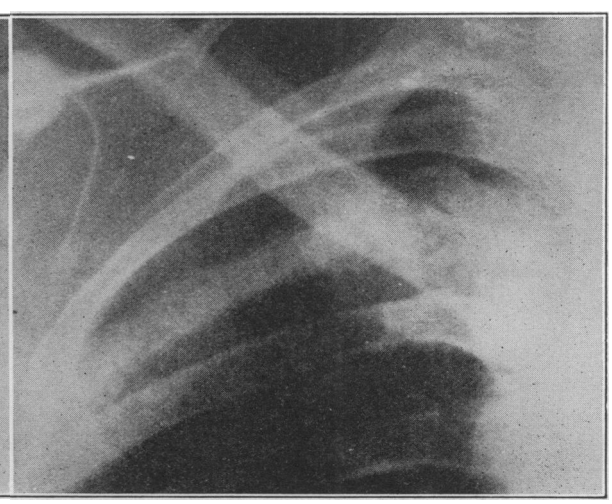

Fig. 2.—Regeneration of bone; shrinking of the tumor mass of the head of the third rib, following x-ray therapy. May, 1927.

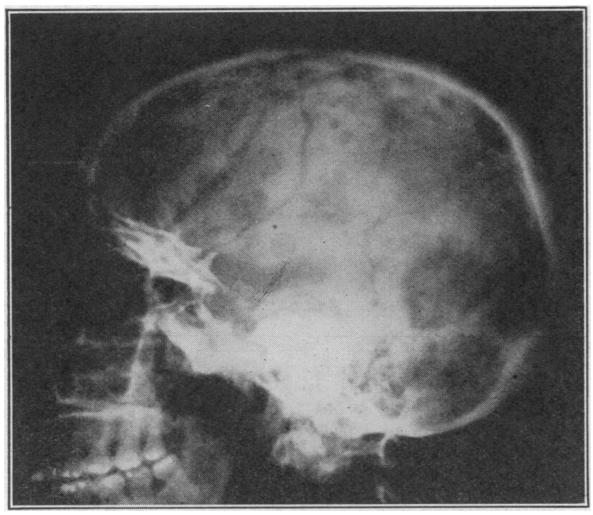

Fig. 3.—Multiple areas of destruction involving the calvarium. October, 1928.

Pathological report by Dr. C. Y. Rusk—Myeloma: The patient went progressively downhill. She had little pain, was weak and exhausted, and died after an illness of three and one-half years from onset.

Autopsy report: The ribs showed an irregular nodular appearance. Section showed medullary portion expanded, portions of the cortex eroded, and in some places thickened by new bone formation. Tissue between the bone was grayish red. The head of the third rib on the right was expanded to a diameter of about two and one-half centimeters. The bone marrow of the right femur showed no gross involvement and was very red and cellular.

Section: The spleen showed excessive blood pigment in the pulp cells, suggesting excessive blood destruction. The femoral bone marrow was hyperplastic and congested with multiple erythroblastic foci and groups of large primitive cells probably of myelocytic series. Decalcified sections of involved ribs showed presence of abnormal cells in a fibrous and vascular stroma. The cells resembled plasma cells, but the cytoplasm was of a distinct granular appearance. Many large phagocytes were seen laden with hemosiderin, due to blood destruction. A desmoplastic reaction was present, surrounding the small groups of remaining tumor cells and filling in the marrow spaces.

COMMENT

Two theories have been held as to the cause of the anemia. The first and most common is that it is result of bone marrow involvement. Charlton [2] found hemosiderosis of the liver and spleen and also an increased icteric index. He regarded this as evidence of blood cell destruction, thus explaining the anemia.

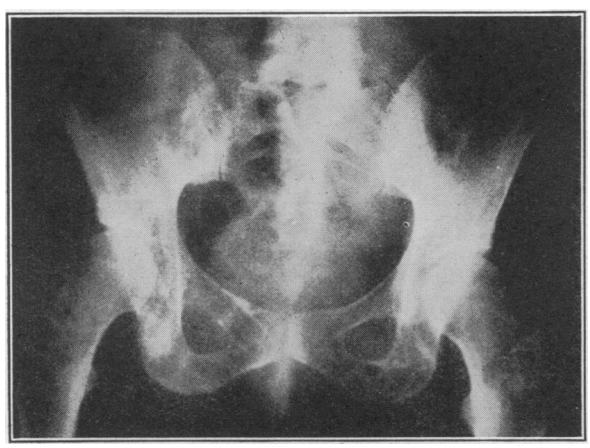

Fig. 4.—Multiple areas of destruction involving the pubic rami. October, 1928.

The above case report also brings out the fact that the anemia is not result of bone marrow involvement. When the patient was first seen in May 1927, the blood showed a hemoglobin of 70 per cent Sahli; red blood cells, 3,850,000. Bony involvement was limited to the third and fourth bodies of the dorsal spine and numerous ribs. Eighteen months later, with further rib involvement and involvement of the pelvis and skull, there was no appreciable change. The hemoglobin was 60 per cent Sahli; red blood cells, 4,000,000. In May 1929, two years since the first blood examination, without further involvement of bones that could be determined by x-ray, the anemia became severe, notwithstanding the fact that under radiation regeneration of bone was seen in some of the involved ribs. The color index did not resemble the secondary anemia from bone marrow involvement, as seen in metastatic malignancy. Early in the disease the color index was 66 per cent; as the anemia became progressive the color index rose and finally just before death, reached 1.3 per cent, resembling a primary anemia.

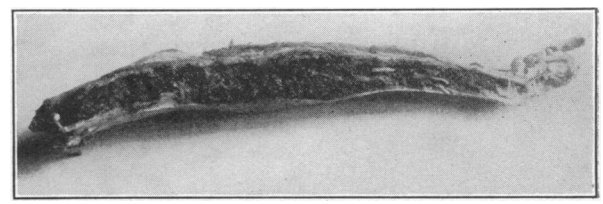

Fig. 5.—Expansion of the medullary portion of the rib by tumor mass, with areas of new bone formation.

Autopsy showed bone involvement only as was found by x-ray films, and evidence of excessive blood destruction in the finding of blood pigment in the pulp cells of the spleen. Hyperplastic and congested bone marrow was found in the long bones not involved by tumor, showing attempts at blood regeneration.

CONCLUSION

A myeloma is a malignant disease of bone associated with an unexplained anemia. The tumor responds to radiation. The anemia is not the result of bone marrow involvement by the tumor. The anemia resembles a primary anemia and all methods of treating primary anemia should be tried, such as liver extract, spleen marrow, and frequent blood transfusions.

450 Sutter Street.

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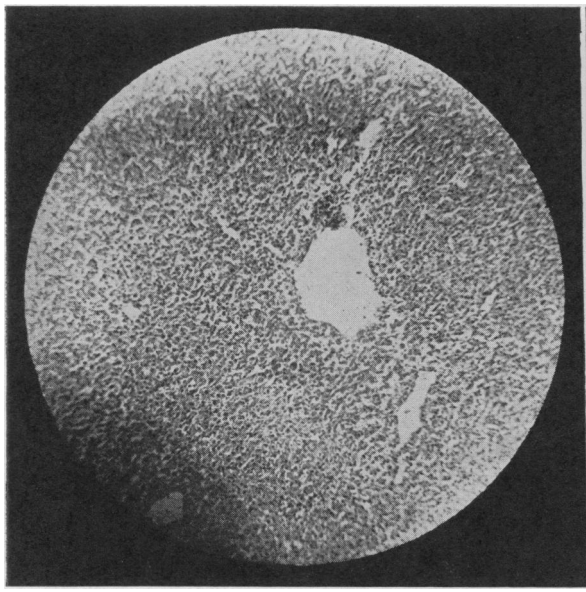

Fig. 6.—Microscopic section of tumor before radiation. Low power.

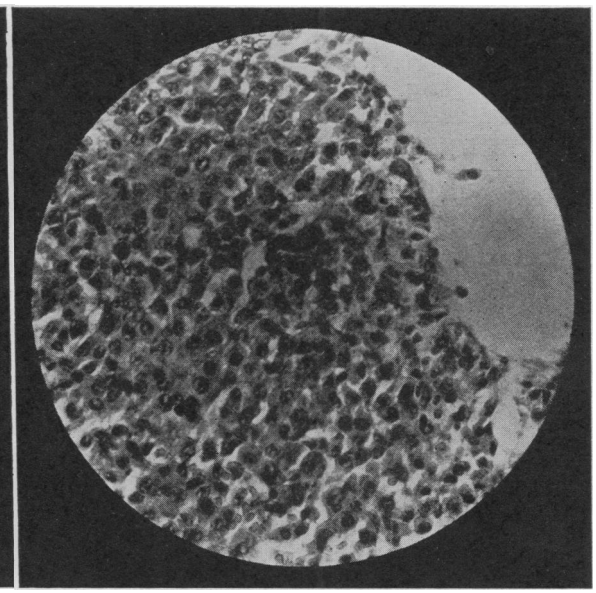

Fig. 7.—Microscopic section of tumor before radiation. High power.

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DISCUSSION

EDWIN I. BARTLETT, M. D. (490 Post Street, San Francisco).—The study of myeloma perhaps has been neglected because we have always considered it to be a hopeless disease, and as far as our records go there is not a single therapeutic cure of an authentic case. Perhaps our indifference and lack of study has allowed a curable disease to remain hopeless. The authors are to be commended for venturing into such an unpromising field and should be encouraged to continue their careful study and close observations. Their description of the disease and differential diagnosis is recommended as a very concise and complete summary, and the case report is unique indeed.

The cure surely is not to be found in surgery, and our results with x-ray and radium thus far have been so disappointing as to justify us in concluding that the cure is not to come from that source. As a palliative measure, however, x-ray may give considerable temporary relief, as illustrated in this instance.

This disease has always seemed to be a general or systemic affair and it has frequently been suspected of being related to the anemias. The investigations by the authors strongly hint in that direction and we may hope, with the better understanding of anemias in general which we have developed the past few years, that internal medicine will find the true explanation and the cure.

C. L. CONNOR, M. D. (University of California Hospital, San Francisco).—Anything which will add to our information concerning multiple myeloma is a worthwhile contribution. It has been established that this disease is a fairly well defined clinical entity, par-

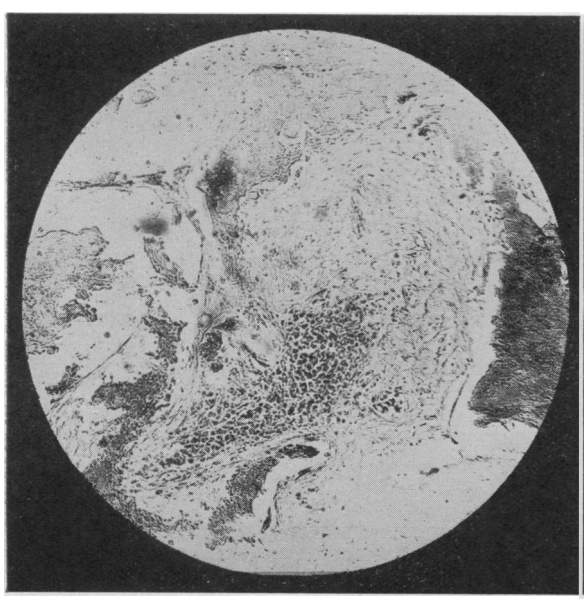

Fig. 8.—Microscopic section of tumor after extensive radiation. Low power.

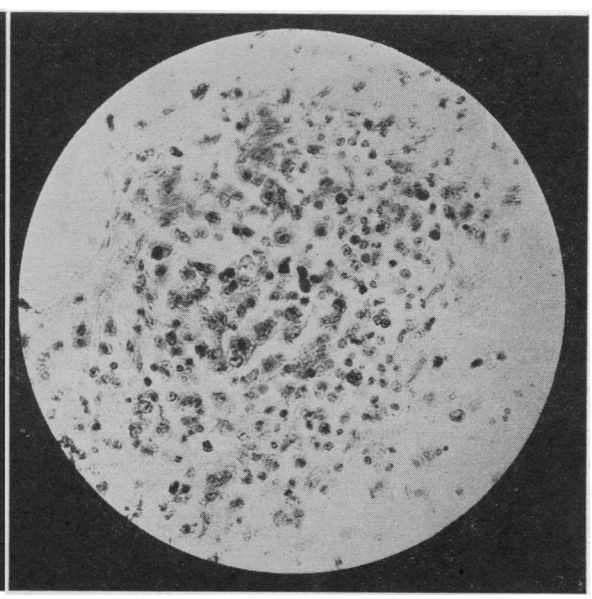

Fig. 9.—Microscopic section of tumor after radiation. High power.

ticularly when it occurs among older people. I should like to have the condition regarded as a more or less specific disease which occurs as a rule after the age of thirty-five. We know, of course, that histologically some of these apparent clinical entities show very diverse pictures. It is not necessary that they be diagnosed definitely as plasmocytomas or myelocytomas or lymphocytomas. It should be sufficient to recognize the undifferentiated character of the cell and to associate this diverse picture with a disease which proceeds in nearly all cases much the same way. I should, therefore, want to remove the so-called myelomas and chloromas which occur in the bones of children and allow these latter to stand as rather special cases which follow no particular course, that might be associated or not with a type of leukemia, and which may be perhaps benefited more by x-ray treatment than the adult type. One may recall that Pepper, a number of years ago, described metastases in the lungs from a multiple myeloma. I would not therefore emphasize, as Doctor Bryan has, the absence of pulmonary metastases as a diagnostic feature.

THE CONDUCT OF NORMAL LABOR*

By JOHN VRUWINK, M. D.
Los Angeles

DISCUSSION *by Thomas F. Wier, M. D., San Diego; Albert V. Pettit, M. D., San Francisco; Louis I. Breitstein, M. D., San Francisco.*

ALIVE mother and baby are minimum requirements of obstetrical art. The optimum standard includes a limited degree of trauma, no morbidity, and only a tolerable amount of pain consistent for the birth of an uninjured baby with unimpaired mentality for later life. Yet, this very common and natural phenomenon of birth is frequently complex and difficult, fraught with many dangers.

Let us concede that the physician today realizes the necessity for surgical asepsis, but we cannot concede the fact that he may be inclined to grow careless. Mortality and morbidity depend on the presence of virulent bacteria, but the condition of the host is also an important and vital factor. Attendants who care for infective conditions will continue to care for the very large majority of labors and they must realize that microscopic organisms in the deeper layer of the skin, gland openings, and the nose and throat are not easily removed by scrubbing or atomizers. They must be convinced that they are potential carriers and must be even more careful than the specialist, who runs from infection as from a fire.

RESPONSIBILITY OF OBSTETRICIAN

Every obstetrician has a responsibility to use certain prophylactic measures to maintain and increase immunity and resistance. First, every patient requires prenatal care to allay fear, to remove foci of infection and further aid resistance by proper food, liquids, rest, and exercise. Second, she requires careful hygienic care during labor, and such is a phase of parturition too frequently neglected. A prodigious amount of energy is expended by the woman in labor, and catabolic changes are inevitable, so that various degrees of acidosis develop, and when given an anesthetic her alkaline reserve is still further reduced. Food, liquids, and rest during labor must be maintained if we wish to reduce morbidity and even mortality, particularly if operative interference becomes necessary. Third, trauma must be limited, for bruised tissue invites and maintains infection. Gross damage is not necessary for incubation purposes, and frequent vaginal and rectal examinations, especially the damage of the cervix by manual dilatation and delivery, or the hurried passage by the fetus through the canal, is more than sufficient. Fourth, each patient requires a true obstetrical diagnosis which includes a complete and general examination. We should have a visual picture of the obstetrical situation at the onset of labor, and then, if we understand the physiology and mechanics of normal labor, we are very likely to know what will happen. A clean vaginal examination to establish such a diagnosis, but not to note progress, outweighs the possibility of introducing infection.

In the aseptic care of our patient, I believe we place too little emphasis on the patient herself, too little study in building and maintaining resistance. During labor, I believe there is too much error due to an incomplete or partial understanding regarding the physiology and mechanics of labor. In the first stage we have recurrent involuntary muscular contractions, the sole aim and object of which are effacement and retraction to the point of complete dilatation. The first stage of labor is merely a dilating stage, such a simple physiological fact, and yet it seems to be a chimerical and utopian fancy to make attendants—including nurses—realize that progress is dilatation, accomplished through involuntary effort. Just why must we forever and ever confuse progress with descent of the presenting part to the point that a number of hours and not the fact of dilatation becomes an indication for cesarean section. Under certain favorable conditions, we may have the synchronous movements of flexion, rotation and descent, but in less favorable conditions, particularly posterior positions with deflection, we most certainly do not have the textbook picture of synchronous action during the period of dilatation.

CARE IN FIRST STAGE OF LABOR

The first stage demands that our attention be focused on rest, liquids, and food. In short labors, they are naturally of less importance. Labors, however, that begin with indefinite irregular pains usually resolve into long tedious labors with a long dilating stage in which hygienic measures are of inestimable value. In any event, one should expect, if there have been no ill-advised attempts to urge the patient beyond physiological limits, to arrive at the end of the first stage with mother and baby in good condition and the supports of the uterus uninjured.

* Read before the Obstetrics and Gynecology Section of the California Medical Association at the fifty-ninth annual session at Del Monte, April 28 to May 1, 1930.